

Variables, Operators, Conditionals and Loops

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Where innovation starts

Content

- Variables
- Operators
- Conditionals
- Loops

Variables

- A variable is a *typed* and *named* storage location
 - `<type> <name> [= <value>];`
- Simple types
 - `byte` (-128, 127)
 - `int` (-10, 2147483647)
 - `float` (3.1425, 2.15)
 - `char` ('a', '!')
 - `boolean` (true, false)
 - `String` ("this is a string")

Variable examples

`int myAge;` ← Declaration

`myAge = 40;` ← Initialization

`String myLanguage = "Processing";` ← Declaration AND initialization

`boolean isALanguage = true;`

`char myChar = 'a';`

`float myFloat = 3.01;`

`int yourAge = myAge;` ← Initializing using another variable's value



Note

- Give variables meaningful names
- Initialize variables before use
- Adhere to naming conventions (camelBack notation)
 - `isABoy` **ok**
 - `IsABoy` **wrong** (well...sort of...)
- Size matters (or in this case, case)
 - `myVariable` **IS NOT** `myvariable`

Operators

- Operators perform transformations on variables
- =
- +, -, *, /, %, ,
- +=, -=, *=, /=, %=
- >, >=, <, <=, ==, !=
- &&, ||
- ++, --
- (? :)
- () for precedence

Operator examples (non exhaustive)

- `int x = 12;`
- `int y = 6;`
- `int xDivY = x / y;`
- `boolean xDivYIsTwo = (xDivY == 2);`
- `x++; y = x++; y = --x; y *= 4;`
- `x = x - y; y = y + x; x = y - x;`
- `float temp = 98.2;`
- `temp = temp % 5;`
- `x = (y > 6) ? 2 : 1;`
- `temp = x` (allowed... no precision loss)
- `x = temp` (not allowed...precision loss)



Conditionals

- `if (<boolean condition>) {
 [<statement>;]*
} else {
 [<statement>;]*
}`
- `switch (<variable>) {
[case <value>:[<statement>;]*]*
[default:[<statements>;]*]
}`

if () { } else { } example

```
String val;
```

```
int x = 5;
```

```
if (x == 5) { val = "five"; }
```

```
else { val = "not five"; }
```

```
println("x = " + val);
```

```
println("x = " + ((x == 5) ? "five" : "not five"));
```



switch () { } example

```
int x = 5; String val;
switch (x) {
case 0:
    val = "zero";
    break;
case 5:
case 6:
    val = "five or six";
default:
    val = "unknown";
    break;
}
```

Oops...?



Do's and don'ts

```
int x = 0;
if (x = 0) { println("x is zero"); }
else { println("x is not zero"); }
```

= != ==

```
if (x == 0) {
    println("x is zero"); ← Use indentation
} else {
    println("x is not zero");
}
```



Loops (for repetitive actions)

- for (<start>; <condition>; <action>) {
 [<statement>;]*
}
- while (<condition>) {
 [<statement>;]*
}
- do {
 [<statement>;]*
} while (<condition>);

for (; ;) loop examples

- for (<start>; <condition>; <action>) {<statements>;}

```
int i;
for (i=0; i<5; i++) print(i);
println();
```

```
int j;
for (i=0, j=5; i<=5; i++, j--) {
    println(i);
    println(j);
}
```





while () { } loop examples

- while (<condition>) {<statements>;}

```
int i = 0;
while (i<5) {
    i++;
    println(i);
}
while (i<5) {
    i++;
    println(i);
}
```



do {} while () loop examples

- do {<statements>;} while (<condition>);

```
int i = 0;
do {
    i++;
    println(i);
} while (i < 5);
do {
    i++;
    println(i);
} while (i < 5);
```

